

What is claimed is:

- 1 1. An apparatus comprising:
2 an embossing tool substrate made of a first metal, a first major surface of the
3 substrate having an embossing profile;
4 a first coating over the first major surface of the substrate, the first coating
5 providing an adherable surface; and
6 a second coating over the first coating, the second coating providing a non-
7 adhesive outer surface.
- 1 2. The apparatus of claim 1, wherein the first coating further comprises:
2 a layer of a second metal deposited over the embossing tool substrate;
3 a layer of metal oxide deposited over the layer of the second metal; and
4 a layer of metal nitride deposited over the layer of metal nitride.
- 1 3. The apparatus of claim 1, wherein the first coating further comprises:
2 a layer of zirconium deposited over the embossing tool substrate;
3 a layer of zirconium oxide deposited over the layer of zirconium; and
4 a layer of zirconium nitride deposited over the layer of zirconium oxide.
- 1 4. The apparatus of claim 1, wherein the second coating comprises poly-para-
2 xylylene.
- 1 5. The apparatus of claim 3, wherein the zirconium layer is about 0.5 microns
2 thick, the zirconium oxide layer is about 0.5 microns thick, the zirconium nitride
3 layer is about 0.5 microns thick, and the second coating comprises poly-para-
4 xylylene and is between about 2 microns and about 9 microns thick.
- 1 6. The apparatus of claim 5, wherein the zirconium layer is 0.5 microns thick,
2 the zirconium oxide layer is 0.5 microns thick, the zirconium nitride layer is 0.5

3 microns thick, and the second coating is between 2 microns and 9 microns thick.

1 7. The apparatus of claim 3, wherein the second coating comprises Parylene
2 Nova HT.

1 8. The apparatus of claim 2, wherein the second coating comprises
2 poly-para-xylylene.

1 9. The apparatus of claim 2, wherein the second coating comprises
2 Parylene Nova HT.

1 10. The apparatus of claim 1, wherein the second coating comprises
2 Parylene Nova HT.

1 11. The apparatus of claim 1, further comprising:
2 a heater apparatus to provide heat during an embossing operation; and
3 a pressure apparatus to apply pressure during the embossing operation.

1 12. The apparatus of claim 1, wherein the first coating further comprises a layer
2 of zirconium deposited over the embossing tool substrate, and wherein the second
3 coating comprises zirconium nitride deposited over the layer of zirconium.

1 13. A method comprising:
2 providing an embossed tool substrate;
3 depositing a first coating over the first major surface of the substrate, the
4 first coating providing an adherable surface; and
5 depositing a second coating over the first coating, the second coating
6 providing a non-adhesive outer surface.

1 14. The method of claim 13, wherein the depositing of the first coating further
2 comprises:

3 depositing a layer of metal over the embossing tool substrate;
4 depositing a layer of metal oxide deposited over the layer of the metal; and
5 depositing a layer of metal nitride deposited over the layer of metal oxide.

1 15. The method of claim 13, wherein the depositing of the first coating further
2 comprises:

3 depositing a layer of zirconium deposited over the embossing tool substrate;
4 depositing a layer of zirconium oxide deposited over the layer of zirconium;
5 and
6 depositing a layer of zirconium nitride deposited over the layer of zirconium
7 oxide.

1 16. The method of claim 13, wherein the depositing of the first coating further
2 comprises:

3 depositing a layer of zirconium over the embossing tool substrate; and
4 wherein the depositing of the second coating further comprises depositing a
5 layer of zirconium nitride over the layer of zirconium.

1 17. The method of claim 13, wherein the depositing of the second coating
2 further comprises depositing poly-para-xylylene.

1 18. The method of claim 15, wherein the zirconium layer is deposited to about
2 0.5 microns thick, the zirconium oxide layer is deposited to about 0.5 microns thick,
3 the zirconium nitride layer is deposited to about 0.5 microns thick, and the
4 depositing of the second coating further comprises depositing poly-para-xylylene to
5 between about 2 microns and about 9 microns thick.

1 19. The method of claim 18, wherein the zirconium layer is deposited to 0.5
2 microns thick, the zirconium oxide layer is deposited to 0.5 microns thick, the
3 zirconium nitride layer is deposited to 0.5 microns thick, and the depositing of the
4 second coating comprises depositing the poly-para-xylylene to between 2 microns
5 and 9 microns thick.

1 20. The method of claim 13, wherein the depositing of the second coating
2 further comprises depositing Parylene Nova HT.

1 21. The method of claim 13, further comprising:
2 heating an embossable substrate during an embossing operation; and
3 applying pressure during the embossing operation.

1 22. The method of claim 13, wherein the first and second coatings provide an
2 embossable substrate and further comprising:
3 embossing the embossable substrate by applying heat and pressing the
4 embossing tool substrate into the embossable substrate.

1 23. An apparatus comprising:
2 an embossing tool that includes:
3 a tool substrate base; and
4 means attached to the tool substrate base for providing a hardened
5 embossing surface with reduced adherence properties to an embossable
6 substrate.

1 24. The apparatus of claim 23, further comprising:
2 means for providing an embossable surface including a polymer film having
3 attached thereto means for releasing the embossing tool, mixed with an epoxy resin.
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1 25. The apparatus of claim 23, wherein the means for providing a hardened
2 embossing surface with reduced adherence properties includes a layer of zirconium
3 on the tool substrate base and a layer of zirconium nitride on the layer of zirconium.

1 26. The apparatus of claim 25, wherein the means for providing a hardened
2 embossing surface with reduced adherence properties further includes a layer of
3 zirconium oxide on the layer of zirconium nitride, and a layer of poly-para-xylylene
4 on the layer of zirconium oxide.